

CLAIMS

What is claimed is:

Sub C1
1. A method of advancing a mining machine including an advancing machine,

2 comprising:

3 bracing the advancing machine within a mine opening;

4 moving the mining machine away from the advancing machine;

5 releasing the advancing machine, and

6 moving the advancing machine toward the mining machine.

1 2. A method according to claim 1, wherein said bracing includes bracing the advancing
2 machine between a roof and a floor of said mine opening.

Sub D1
1 3. A method according to claim 1, wherein said bracing includes bracing the advancing
2 machine between walls of said mine opening.

Sub E2
1 4. A method of steering a mining machine having a plurality of sides and having an
2 advancing machine operatively connected thereto, comprising:
3 bracing the advancing machine within a mine opening; and
4 increasing a distance between the advancing machine and the mining machine by
5 different amounts on two of the plurality of sides.

Sub F1
1 5. A method according to claim 4, wherein said bracing includes bracing the advancing
2 machine between a roof and a floor of said mine opening.

1 6. A method according to claim 4, wherein said bracing includes bracing the advancing
2 machine between walls of said mine opening.

Sub
A3
1 7. A method of retrieving a mining machine including an advancing machine,
2 comprising:

3 bracing the advancing machine within a mine opening;

4 moving the mining machine toward the advancing machine;

5 releasing the advancing machine; and

6 moving the advancing machine away from the mining machine.

Sub
D1
1 8. A method according to claim 7, wherein said bracing includes bracing the advancing
2 machine between a roof and a floor of said mine opening.

1 9. A method according to claim 7, wherein said bracing includes bracing the advancing
2 machine between walls of said mine opening.

Sub
A3
1 10. An apparatus for advancing and steering a mining machine, comprising:

2 an advancing machine;

3 a brace coupled to said advancing machine and being extendable to brace said
4 advancing machine within a mine opening; and

5 an extender operatively coupled between said advancing machine and the mining
6 machine and capable of extension and retraction.

Sub
D1
1 11. An apparatus according to claim 10, further comprising a second extender operatively
2 coupled between said advancing machine and the mining machine and capable of extension
3 and retraction.

1 12. An apparatus according to claim 10, wherein said brace comprises a hydraulic
2 cylinder.

Sub D1
1 13. An apparatus according to claim 10, wherein said extender comprises a hydraulic
2 cylinder.

1 14. An apparatus according to claim 10, wherein said brace and said extender comprise
2 electrical actuators.

1 15. An apparatus according to claim 10, wherein said brace is extendable to brace said
2 advancing machine between a roof and a floor of said mine opening.

1 16. An apparatus according to claim 10, wherein said brace is extendable to brace said
2 advancing machine between walls of said mine opening.

1 17. A method of navigating a mining machine including an advancing machine,
2 comprising:

3 bracing the advancing machine within a mine opening;

4 bracing the mining machine within said mine opening;

5 determining a first relative position of the advancing machine and the mining
6 machine;

7 releasing the mining machine;

8 moving the mining machine away from the advancing machine;

9 bracing the mining machine;

10 determining a second relative position of the advancing machine and the mining
11 machine;

12 releasing the advancing machine; and

13 moving the advancing machine toward the mining machine.

1 18. A method according to claim 17, wherein said determining of relative positions
2 includes measuring at least two variable dimensions between the advancing machine and the
3 mining machine.

1 19. An apparatus for navigating a mining machine comprising:
2 an advancing machine;
3 a first brace coupled to said advancing machine and being extendable to brace said
4 advancing machine within a mine opening;
5 an extender operatively coupled between said advancing machine and the mining
6 machine and capable of extension and retraction; and
7 a distance measurer operatively coupled to measure at least two dimensions between
8 the mining machine and said advancing machine.

1 20. An apparatus according to claim 19, further comprising a second brace coupled to the
2 mining machine and being extendable to brace the mining machine within said mine opening.

1 21. An apparatus according to claim 20, wherein said distance measurer comprises a
2 rotary potentiometer.

1 22. An apparatus according to claim 20, wherein said distance measurer comprises a
2 linear potentiometer.

1 23. An apparatus according to claim 20, wherein said distance measurer is an integral part
2 of said advancing machine.

1 24. An apparatus according to claim 20, wherein said extender comprises an electrical
2 actuator.

1 25. An apparatus according to claim 20, wherein said extender comprises a hydraulic or
2 pneumatic cylinder.

1 26. A method of conveying material from a remote mining machine having a longitudinal
2 axis using conveying units, each unit having a traction element, comprising:
3 assembling at least some of the conveying units into a conveying assembly, and
4 engaging at least some of the traction elements of the conveying units of said
5 conveying assembly to move said conveying assembly.

1 27. A method according to claim 26, wherein said engaging includes providing a driving
2 force to each of the conveying units of said conveying assembly.

1 28. A method according to claim 27, wherein said providing includes providing a
2 synchronized driving force to each of the conveying units of said conveying assembly.

1 29. A method according to claim 26, wherein said assembling includes connecting the
2 conveying units of said conveying assembly to substantially prevent rotation between
3 adjacent conveying units about the longitudinal axis.

1 30. An apparatus for conveying material from a remote mining machine having a
2 longitudinal axis, comprising:

3 a conveying assembly comprising a plurality of conveying units; and
4 a connector coupling adjacent ones of said conveying units so as to substantially
5 prevent rotation between said adjacent conveying units about the longitudinal axis.

1 31. An apparatus according to claim 30, wherein at least some of said conveying units
2 include a propelling device.

32. An apparatus according to claim 31 wherein said propelling device comprises powered wheels.

33. An apparatus according to claim 31, further comprising at least one common drive shaft operatively coupled to said propelling device.

34. An apparatus according to claim 33, wherein a plurality of said conveying units include a propelling device and said at least one common drive shaft is operatively coupled to each of said propelling devices.

35. An apparatus according to claim 33, further comprising a power unit located at a discharge end of said conveying assembly operatively coupled to drive said at least one common drive shaft.

36. An apparatus according to claim 33, further comprising a power unit located at a feed end of said conveying assembly operatively coupled to drive said at least one common drive shaft.

37. An apparatus according to claim 33, further comprising a power unit located at a discharge end of said conveying assembly and a power unit located at a feed end of said conveying assembly, said power units being operatively coupled to drive said at least one common drive shaft.

38. An apparatus according to claim 30, wherein said connector comprises:
a pin on a first conveying unit of said adjacent conveying units;
a fork positioned on a second conveying unit of said adjacent conveying units, said fork able to engage and disengage said pin; and

5 a hook movably positioned on either said first or said second conveying unit and
6 having a first position, in which said hook couples said adjacent conveying units, while
7 allowing limited relative motion between said adjacent conveying units about an axis
8 substantially perpendicular to the longitudinal axis, and a second position, in which said hook
9 does not couple said adjacent conveying units.

1 39. An apparatus according to claim 38, wherein said fork has an opening with a size
2 greater than a size of said pin for allowing a limited relative motion between said adjacent
3 conveying units the longitudinal axis.

1 40. An apparatus according to claim 38, further comprising a spring operatively
2 connected to bias the position of said hook.